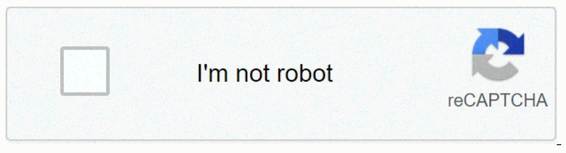

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Multi step equation worksheet

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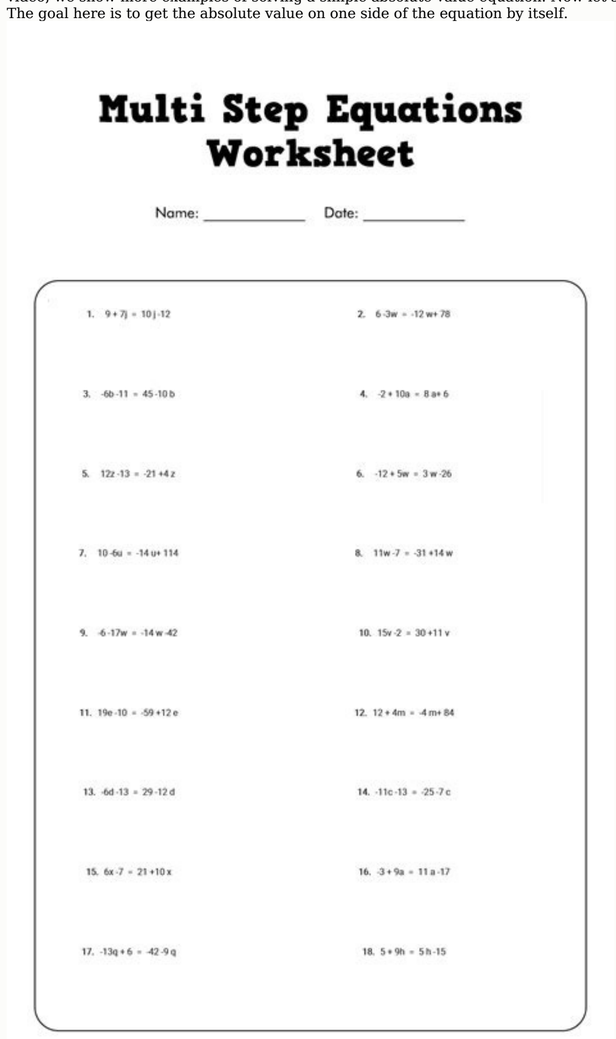
Distributive property multi step equation worksheet.

Linear Equations: One Solution, No Solution, Infinitely Many Solutions Card SortLinear Equations: One Solution, No Solution, Infinitely Many Solutions Card SortUse this engaging card-sort activity to help eighth-grade math learners practice finding the number of solutions of linear equations. Live worksheets > English > Math > Equations > Multi-Step Equation Test Finish!! Please allow access to the microphone Look at the top of your web browser. If you see a message asking for permission to access the microphone, please allow. Close Steps With an End In Sight There are some equations that you can solve in your head quickly. For example—what is the value of y in the equation [latex]2y=6[/latex]? Chances are you didn’t need to get out a pencil and paper to calculate that [latex]y=3[/latex]. You only needed to do one thing to get the answer: divide 6 by 2. Other equations are more complicated. Solving [latex]\displaystyle 4\left(\frac{1}{3}t+\frac{1}{2}\right)=6[/latex] without writing anything down is difficult! That’s because this equation contains not just a variable but also fractions and terms inside parentheses. This is a multi-step equation, one that takes several steps to solve. Although multi-step equations take more time and more operations, they can still be simplified and solved by applying basic algebraic rules.

Remember that you can think of an equation as a balance scale, with the goal being to rewrite the equation so that it is easier to solve but still balanced. The addition property of equality and the multiplication property of equality explain how you can keep the scale, or the equation, balanced. Whenever you perform an operation to one side of the equation, if you perform the same exact operation to the other side, you’ll keep both sides of the equation equal. If the equation is in the form [latex]ax+b=c[/latex], where x is the variable, you can solve the equation as before. First “undo” the addition and subtraction, and then “undo” the multiplication and division. In the following video we show examples of solving two step linear equations. In the following video, we show an example of solving a linear equation that requires combining like terms. Some equations may have the variable on both sides of the equal sign, as in this equation: [latex]4x-6=2x+10[/latex]. To solve this equation, we need to “move” one of the variable terms. This can make it difficult to decide which side to work with. It doesn’t matter which term gets moved, [latex]4x[/latex] or [latex]2x[/latex], however, to avoid negative coefficients, you can move the smaller term. Solve: [latex]4x-6=2x+10[/latex] In this video, we show an example of solving equations that have variables on both sides of hte equal sign. Solving Multi-Step Equations With Absolute Value We can apply the same techniques we used for solving a one-step equation which contains absolute value to an equation that will take more than one step to solve. Let’s start with an example where the first step is to write two equations, one equal to positive 26 and one equal to negative 26. In the next video, we show more examples of solving a simple absolute value equation. Now let’s look at an example where you need to do an algebraic step or two before you can write your two equations.

The goal here is to get the absolute value on one side of the equation by itself.

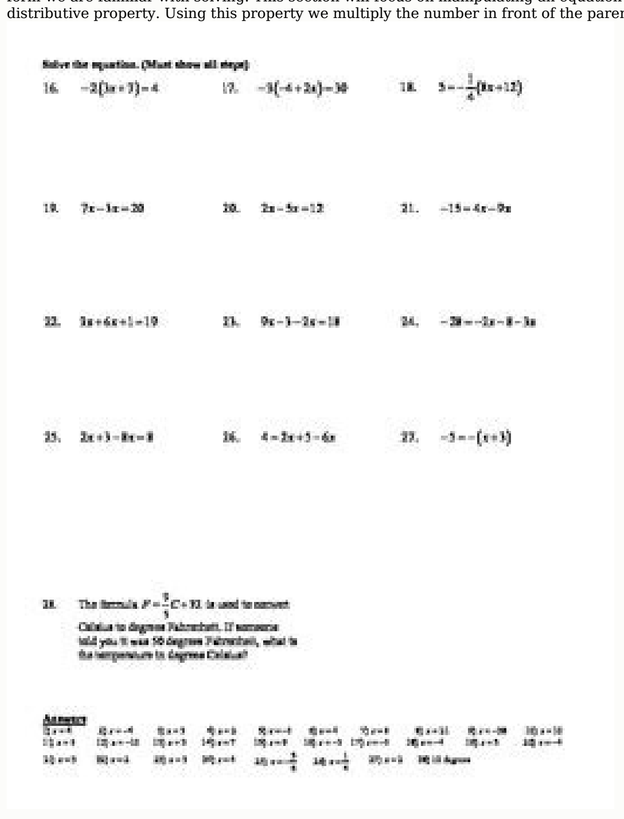


Multi Step Equations Worksheet

Name: _____ Date: _____

1. $9+7j=10j-12$
2. $6-3w=-12w+78$
3. $-6b-11=45-10b$
4. $-2+10a=8a+6$
5. $12z-13=-21+4z$
6. $-12+5w=3w-26$
7. $10-6u=-14u+114$
8. $11w-7=-31+14w$
9. $-6-17w=-14w-42$
10. $15v-2=30+11v$
11. $19e-10=-59+12e$
12. $12+4m=-4m+84$
13. $-6d-13=29-12d$
14. $-11c-13=-25-7c$
15. $6x-7=21+10x$
16. $-3+9a=11a-17$
17. $-13q+6=-42-9q$
18. $5+9h=5h-15$

Then we can proceed as we did in the previous example. In the two videos that follow, we show examples of how to solve an absolute value equation that requires you to isolate the absolute value first using mathematical operations. The Distributive Property As we solve linear equations, we often need to do some work to write the linear equations in a form we are familiar with solving. This section will focus on manipulating an equation we are asked to solve in such a way that we can use the skills we learned for solving multi-step equations to ultimately arrive at the solution. Parentheses can make solving a problem difficult, if not impossible. To get rid of these unwanted parentheses we have the distributive property. Using this property we multiply the number in front of the parentheses by each term inside of the parentheses.



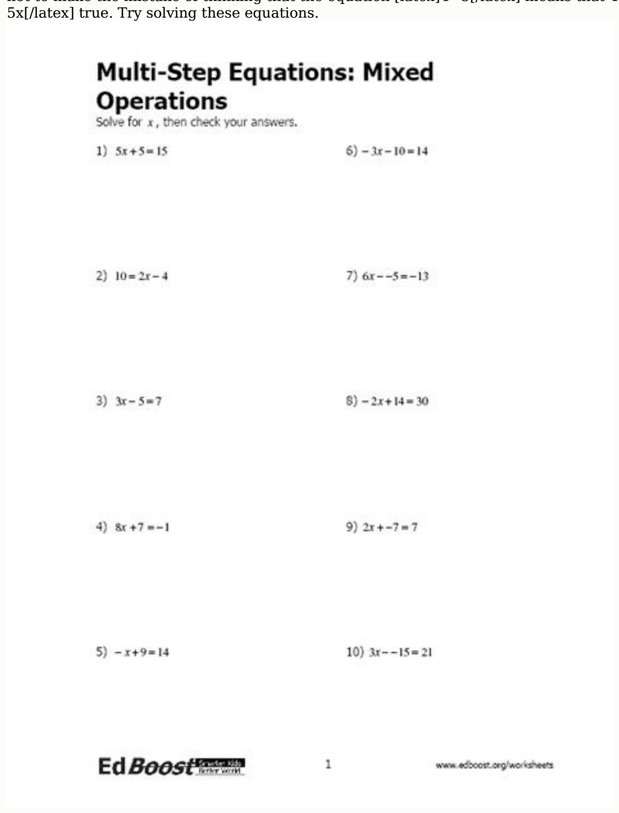
Solve the equation. (Must show all steps)

16. $-2(3x+7)=4$
17. $-3(-6+2x)=30$
18. $5=-\frac{1}{4}(8x+12)$
19. $7x-3x=20$
20. $2x-5x=12$
21. $-15=4x-9x$
22. $3x+6x+1=19$
23. $9x-3=2x-18$
24. $-28=-2x-8-3x$
25. $2x+3=8x=8$
26. $4=2x+5-6x$
27. $-5=-(x+1)$
28. The formula $F=\frac{9}{5}C+32$ is used to convert Celsius to degrees Fahrenheit. If someone told you it was 50 degree Fahrenheit, what is the temperature in degrees Celsius?

Answers:
1) $x=6$ 2) $x=-4$ 3) $x=3$ 4) $x=3$ 5) $x=-7$ 6) $x=6$ 7) $x=8$ 8) $x=11$ 9) $x=-36$ 10) $x=13$
11) $x=3$ 12) $x=-10$ 13) $x=3$ 14) $x=7$ 15) $x=9$ 16) $x=-3$ 17) $x=-6$ 18) $x=-4$ 19) $x=5$ 20) $x=-4$
21) $x=3$ 22) $x=3$ 23) $x=3$ 24) $x=4$ 25) $x=-\frac{5}{6}$ 26) $x=\frac{1}{6}$ 27) $x=3$ 28) 10 degrees

For all real numbers a, b, and c, [latex]a(b+c)=ab+ac[/latex]. What this means is that when a number multiplies an expression inside parentheses, you can distribute the multiplication to each term of the expression individually. Then, you can follow the steps we have already practiced to isolate the variable and solve the equation. In the video that follows, we show another example of how to use the distributive property to solve a multi-step linear equation. In the next example, you will see that there are parentheses on both sides of the equal sign, so you will need to use the distributive property twice. Notice that you are going to need to distribute a negative number, so be careful with negative signs! In the following video, we solve another multi-step equation with two sets of parentheses. Sometimes, you will encounter a multi-step equation with fractions. If you prefer not working with fractions, you can use the multiplication property of equality to multiply both sides of the equation by a common denominator of all of the fractions in the equation. This will clear all the fractions out of the equation. See the example below. Of course, if you like to work with fractions, you can just apply your knowledge of operations with fractions and solve. In the following video, we show how to solve a multi-step equation with fractions. Regardless of which method you use to solve equations containing variables, you will get the same answer. You can choose the method you find the easiest! Remember to check your answer by substituting your solution into the original equation. Sometimes, you will encounter a multi-step equation with decimals. If you prefer not working with decimals, you can use the multiplication property of equality to multiply both sides of the equation by a a factor of 10 that will help clear the decimals. See the example below. In the following video, we show another example of clearing decimals first to solve a multi-step linear equation. Here are some steps to follow when you solve multi-step equations. 1. (Optional) Multiply to clear any fractions or decimals. 2.

Simplify each side by clearing parentheses and combining like terms.
3. Add or subtract to isolate the variable term—you may have to move a term with the variable. 4. Multiply or divide to isolate the variable. 5. Check the solution. Classify Solutions to Linear Equations There are three cases that can come up as we are solving linear equations. We have already seen one, where an equation has one solution. Sometimes we come across equations that don’t have any solutions, and even some that have an infinite number of solutions. The case where an equation has no solution is illustrated in the next examples. Equations with no solutions This is not a solution! You did not find a value for x. Solving for x the way you know how, you arrive at the false statement [latex]4=5[/latex]. Surely 4 cannot be equal to 5! This may make sense when you consider the second line in the solution where like terms were combined. If you multiply a number by 2 and add 4 you would never get the same answer as when you multiply that same number by 2 and add 5. Since there is no value of x that will ever make this a true statement, the solution to the equation above is “no solution.” Be careful that you do not confuse the solution [latex]x=0[/latex] with “no solution.” The solution [latex]x=0[/latex] means that the value 0 satisfies the equation, so there is a solution. “No solution” means that there is no value, not even 0, which would satisfy the equation. Also, be careful not to make the mistake of thinking that the equation [latex]4=5[/latex] means that 4 and 5 are values for x that are solutions. If you substitute these values into the original equation, you’ll see that they do not satisfy the equation. This is because there is truly no solution—there are no values for x that will make the equation [latex]12+2x-8=7x+5-5x[/latex] true. Try solving these equations.



Multi-Step Equations: Mixed Operations

Solve for x, then check your answers.

1) $5x+5=15$

2) $10=2x-4$

3) $3x-5=7$

4) $8x+7=-1$

5) $-x+9=14$

6) $-3x-10=14$

7) $6x--5=-13$

8) $-2x+14=30$

9) $2x+-7=7$

10) $3x--15=21$

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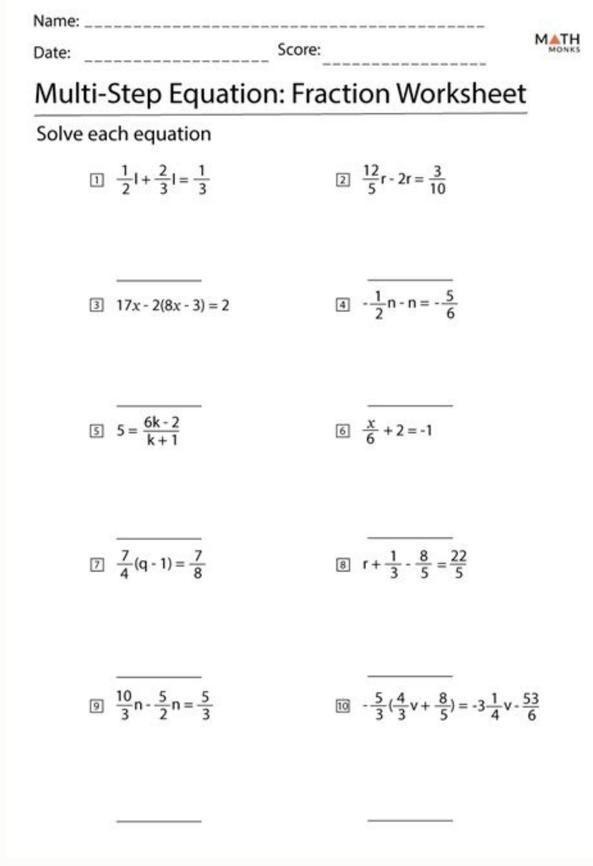
How many steps do you need to take before you can tell whether the equation has no solution or one solution? a) Solve [latex]8y=3(y+4)+y[/latex] Use the textbox below to record how many steps you think it will take before you can tell whether there is no solution or one solution.
b) Solve [latex]2\left(3x-5\right)-4x=2x+7[/latex] Use the textbox below to record how many steps you think it will take before you can tell whether there is no solution or one solution. Algebraic Equations with an Infinite Number of Solutions You have seen that if an equation has no solution, you end up with a false statement instead of a value for x. It is possible to have an equation where any value for x will provide a solution to the equation. In the example below, notice how combining the terms [latex]5x[/latex] and [latex]-4x[/latex] on the left leaves us with an equation with exactly the same terms on both sides of the equal sign.



Name: _____

Date: _____ Score: _____

MATH MONKS

Multi-Step Equation: Fraction Worksheet

Solve each equation

1) $\frac{1}{2}l+\frac{2}{3}l=\frac{1}{3}$

2) $\frac{12}{5}r-2r=\frac{3}{10}$

3) $17x-2(8x-3)=2$

4) $-\frac{1}{2}n-n=-\frac{5}{6}$

5) $5=\frac{6k-2}{k+1}$

6) $\frac{x}{6}+2=-1$

7) $\frac{7}{4}(q-1)=\frac{7}{8}$

8) $r+\frac{1}{3}-\frac{8}{5}=\frac{22}{5}$

9) $\frac{10}{3}n-\frac{5}{2}n=\frac{5}{3}$

10) $-\frac{5}{3}(\frac{4}{3}v+\frac{8}{5})=-3\frac{1}{4}v-\frac{53}{6}$

You arrive at the true statement “[latex]3=3[/latex].” When you end up with a true statement like this, it means that the solution to the equation is “all real numbers.” Try substituting [latex]x=0[/latex] into the original equation—you will get a true statement! Try [latex]x=-\frac{3}{4}[/latex], and it also will check! This equation happens to have an infinite number of solutions. Any value for x that you can think of will make this equation true. When you think about the context of the problem, this makes sense—the equation [latex]x+3=3+x[/latex] means “some number plus 3 is equal to 3 plus that same number.” We know that this is always true—it’s the commutative property of addition! In the following video, we show more examples of attempting to solve a linear equation with either no solution or many solutions. In this video, we show more examples of solving linear equations with either no solutions or many solutions. In the following video, we show more examples of solving linear equations with parentheses that have either no solution or many solutions. Absolute value equations with no solutions As we are solving absolute value equations it is important to be aware of special cases. An absolute value is defined as the distance from 0 on a number line, so it must be a positive number. When an absolute value expression is equal to a negative number, we say the equation has no solution, or DNE. Notice how this happens in the next two examples. In this last video, we show more examples of absolute value equations that have no solutions. Summary Equations are mathematical statements that combine two expressions of equal value. An algebraic equation can be solved by isolating the variable on one side of the equation using the properties of equality. To check the solution of an algebraic equation, substitute the value of the variable into the original equation. Complex, multi-step equations often require multi-step solutions. Before you can begin to isolate a variable, you may need to simplify the equation first. This may mean using the distributive property to remove parentheses or multiplying both sides of an equation by a common denominator to get rid of fractions. Sometimes it requires both techniques. If your multi-step equation has an absolute value, you will need to solve two equations, sometimes isolating the absolute value expression first. We have also seen that solutions to equations can fall into three categories: One solution No solution, DNE (does not exist) Many solutions, also called infinitely many solutions or All Real Numbers And sometimes, we don’t need to do much algebra to see what the outcome will be. Multi-Step Equations: Discover an extensive collection of free printable math worksheets, designed to help students and teachers explore, practice, and master solving multi-step equations in a fun and interactive way. Worksheet KG class 1 class 2 class 3 class 4 class 5 class 6 class 7 class 8 Multi-Step Equations worksheets are an essential tool for teachers looking to help their students master the intricacies of Math and Algebra. These worksheets focus on One-Variable Equations and provide a structured approach to Solving Equations, ensuring that students develop a strong foundation in this critical area of mathematics. By incorporating these worksheets into their lesson plans, teachers can provide students with a variety of problems to solve, allowing them to practice and hone their skills in solving Multi-Step Equations. As students progress through the worksheets, they will gain confidence in their ability to tackle increasingly complex problems, ultimately preparing them for success in higher-level Math and Algebra courses. Quizizz is an excellent platform for teachers to supplement their Multi-Step Equations worksheets and enhance their students' learning experience. With Quizizz, teachers can create interactive quizzes and games that align with their lesson plans, providing students with an engaging and fun way to practice their Math and Algebra skills. In addition to One-Variable Equations, Quizizz offers a wide range of topics and question types, allowing teachers to customize their quizzes to suit the needs of their students. By incorporating Quizizz into their teaching strategy, educators can not only reinforce the concepts covered in their Multi-Step Equations worksheets but also provide students with a dynamic and interactive learning environment that fosters a deeper understanding of Math and Algebra concepts.